PRECAST CONCRETE SYSTEMS DELIVER
Now more than ever, we realize the importance of designing and constructing multifamily homes that will lower heating and cooling requirements, reduce the impact to our environment and keep our families safe. Energy costs continue to rise with the increased demand for oil, coal and natural gas, even while our supplies of these valuable resources are being depleted. Concern for the long-term health of our environment is very real and the building materials and methods used to construct our homes have a great deal of influence on the future of our planet’s ecosystem. The expansion of our population into areas prone to natural disasters such as hurricanes, tornados, wildfires, floods and severe winter weather means more persons are at risk of being injured by forces of nature or even negligence by their fellow man. All of these factors are accentuated when we go from a single family home to multifamily housing. Because of this, it is imperative for our nation’s architects, developers, public officials, builders and homeowners to examine and implement a total building systems approach for our housing needs.

Fortunately, there are manufacturing and construction companies that are striving to do just that. Many of the companies utilize cement and concrete-based building materials to achieve the above-stated goals. Dukane Precast Inc., is an example of one such company. Based out of Naperville, Illinois, Dukane’s primary objectives in the Chicagoland housing market are to build the safest, most energy-efficient and sustainable homes possible. They are utilizing their own innovative prestressed/precast concrete wall and floor panels and integrating advanced materials and technologies from other manufacturers to optimize the completed building’s overall performance. The easiest way to understand the total housing package that Dukane delivers is to examine each of their three goals individually.

For additional information, contact:
Brian Bock
Dukane Precast Inc.
630.355.8118
bbock@dukaneprecast.com
www.dukane-precast.com
or
Precast/Prestressed
Concrete Institute (PCI)
312.786.3000
www pci.org
1 ENERGY EFFICIENCY

Dukane's Double-wall precast concrete system is a combination of wall panels and floor panels. The walls are a sandwich panel, comprised of two layers of prestressed high-strength concrete that surround a factory-installed layer of high R-value insulation (range of R-21 to R-49). The floors are also a sandwich panel, with the bottom layer serving as the finished ceiling below and the top layer serving as the finished floor above (no leveling course required). The insulating foam can also be injected into these panels for high ceiling R-values. The newest floor option is a Single-Floor that has a smooth concrete layer above with an open webbed steel truss system underneath that allows placement of HVAC and electrical runs that can be hidden within the ceiling space without drop-down soffits.

This unique Double-wall system has a finished surface on both sides of the walls and floors. Each surface is ready to paint, no drywall is needed. Electrical boxes and conduit are cast at the plant directly from the architect's CADD drawings using a robot and laser-layout methods. The end result of the completed precast concrete structure are walls and floors that have the thermal mass of concrete inside the building envelope, thus dramatically improving energy performance. Air infiltration is also remarkably low with this system because of the total continuity of the exterior shell. Repeated energy analyses done to establish HERS ratings on these precast concrete homes have rated them amongst the “tightest” buildings yet tested, further adding to the energy performance. A number of homes built with this precast concrete technology have incorporated radiant floor heating, high velocity cooling, geothermal systems, heat recovery ventilators and other common energy-saving items such as Low-E glass windows and doors.

Soy-based foam insulation is seen sandwiched in the center of the Double-wall.

2 SUSTAINABILITY

Because these multifamily homes are constructed with concrete they will last for centuries, not just decades, and will require only minimal maintenance to continue to look beautiful. The exciting advancements in concrete mix designs over the last 20 years are well showcased in the Double-wall product line. Recycled content within the precast concrete walls and floors can approach 40%. Fly ash, slag cement, slag aggregate and other waste or recycled materials from other industries are often used as replacements to the standard products in a batch of concrete, thus reducing a tremendous amount of landfill materials. Bio-based foam insulations that utilize castor oil or soybean derivatives deliver extremely high R-values for the walls and ceilings. Because the precast walls are a finished surface on the inside, no additional wood stud or drywall is needed; thus less material is required to complete the home.

A 2 x 4 is stopped cold by the precast concrete wall as demonstrated in this recent tornado cannon test.

3 LIFE SAFETY

Protection from the perils of nature and man is best achieved with cement and concrete-based systems. Total precast concrete systems such as the Double-wall give the occupants of a multifamily housing complex the highest degree of safety from fire, hurricane and tornado force winds. An added bonus is the reduction of sound transmission through the walls and floors. From passing thunderstorms, train and highway traffic, or noisy neighbors, the same structure that keeps you safe also gives a great feeling of comfort and quiet.

Reprinted with permission from ECOLOGICAL IDEAS magazine, Fall 2007.
Concrete Homes DELIVER...
Life Safety  Energy Efficiency  Sustainability

To find out more about the Concrete Advantages of the fastest growing method of home construction in the United States, visit us online at:

PCI Precast/Prestressed Concrete Institute
wwwpci.org

Dukane Precast
www.dukaneprecast.com

Concrete Homes
www.concretehomes.com